

Patent Claims

1. A multifunctional illumination device, in particular for use in a motor vehicle,

**characterized in that**

the luminous means of the illumination device are formed by an arrangement of a multiplicity of semiconductor light sources grouped to form an array, and in that sensor elements are arranged instead of the semiconductor light sources at individual positions of this array.

2. The multifunctional illumination device as claimed in claim 1,

characterized in that

the semiconductor light sources emit light in different wavelength regions, in particular both in the visible wavelength region and in the infrared wavelength region.

3. The multifunctional illumination device as claimed in one of the preceding claims,

characterized in that

optical systems to the individual semiconductor light sources are designed as flat elements whose light entry opening have an elongated, substantially rectangular shape.

4. The multifunctional illumination device as claimed in claim 3,

characterized in that

perpendicular to the light entry surface the individual optical systems have a central region whose projection into a two-dimensional plane corresponds to a cylindrical 2-dimensional Cartesian oval, and in that this central region is combined with a parabolic reflector.

5. The multifunctional illumination device as claimed in one of the preceding claims, characterized in that at least one of the individual optical systems is assigned a number of semiconductor sources or sensor elements.

6. The multifunctional illumination device as claimed in one of the preceding claims, characterized in that the illumination device comprises a means enabling the individual semiconductor light sources and the sensor elements to be switched individually or in groups.

7. The multifunctional illumination device as claimed in one of the preceding claims, characterized in that the specific sensor elements are assigned to specific semiconductor light sources, and in that a means is provided for operating the sensor elements in a fashion synchronized with the semiconductor light sources assigned to them.

8. The multifunctional illumination device as claimed in one of the preceding claims, characterized in that the sensor elements are photodiodes.

9. The multifunctional illumination device as claimed in one of the preceding claims, characterized in that the sensor elements are antennas.

10. The multifunctional illumination device as claimed in claim 9,  
characterized in that  
the antennas are connected to a transceiver unit.

11. A method for operating a multifunctional illumination device as claimed in one of claims 1 to 10,  
characterized in that  
the sensor elements and semiconductor light sources are driven independently individually or in groups.

12. The method as claimed in claim 11,  
characterized in that  
individual sensor elements are operated synchronously with semiconductor light sources assigned to them.

13. Use of a multifunctional illumination device as claimed in one of the preceding claims for the purpose of measuring distances and/or determining visibility.

14. Use of a multifunctional illumination device as claimed in one of the preceding claims for the purpose of measuring the ambient light.

15. Use of a multifunctional illumination device as claimed in one of the preceding claims in a system for improving night vision that operates on the basis of active infrared or ultraviolet ambient illumination.

16. Use of a multifunctional illumination device as claimed in one of the preceding claims as vehicle-to-vehicle communication system in a motor vehicle.

17. Use of a multifunctional illumination device as claimed in one of the preceding claims for the purpose of detecting objects in the surroundings of the device using the radar principle.